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ABSTRACT

The Oregon Quality Education Model (QEM) was developed by the state to identify the fundamental requirements and costs for a quality education that meets Oregon's academic standards. It will determine the funding of Oregon schools. Among the assumptions upon which the QEM is built were that elementary school enrollment is 340 students, middle school enrollment is 500, high school enrollment is 1,000, and schools are close to an urbanized area. In this white paper, the QEM is applied to schools with characteristics significantly different from those assumptions. Data are presented showing how much more education costs in such schools and where those costs are centered. Findings are used to generate recommendations for policymakers on how to assure equity of services for small, rural schools. A review of the QEM funding scheme and the formula that weights the student count to offset additional costs for small schools yields the following recommendations: "small" must be redefined, a middle school element must be created, centralized services must be reviewed for districts with low enrollment, weighting must be modified to reflect QEM cost elements, and funding levels must be aligned with Ballot Measure 1. In addition, some protection is recommended to prevent spending of education dollars on student transportation in sparsely populated school districts. A separate revenue stream may enable remote school districts to access infrastructure commonly available in urban areas. (TD)

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White Paper

The Oregon Quality Education Model applied to schools characterized by low student enrollment, sparse distribution of students, and remote settings with findings relating to equity of services

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January 8, 2001

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Overview

The Oregon Quality Education Model [QEM] is the work of a twenty-two-person group appointed by Lynn Lundquist, Speaker of the Oregon House of Representatives. This model identifies the fundamental requirements and costs for a quality education designed to meet the high academic standards established in Oregon by the Education Reform Act.

The work was reviewed by a second, eleven-person panel jointly appointed by Governor Kitzhaber and Superintendent Bunn. The revised model is referred to as QEM 2000. It is to be used as the standard by which funding of Oregon schools is judged beginning with the 2001-03 budget.

QEM creates prototype elementary, middle, and high schools. These prototypes are conceived to account for funds allotted to each level including centralized costs such as district administration. Among the assumptions upon which the QEM was built were these.

QEM prototypes assume geographic location is in close proximity to an urbanized area.

- Elementary school student enrollment is 340.
- Middle school student enrollment is 500.
- High school student enrollment is 1000.
- The schools are located in close proximity to an urbanized area.

This White Paper is developed with respect to schools with characteristics significantly different from these assumptions. The goal is to provide accurate data consistent with the model to give precision to widely accepted concepts that schools with low enrollments, schools set in sparsely populated regions, and isolated schools do, in fact, cost more to operate. Insight is gained on two dimensions. How much more does education cost? Where are those costs centered?

As an example, the baseline model when rigidly applied to a high school with 264 students calls for a certified staff of 5.49 FTE to teach core subjects of math, English, science, social studies, second language, and electives. That staffing could not meet state quality standards. An alternate configuration needs to be designed to meet both legal requirements (including licensure) and quality measures. The finding here is that it will require 13.5 FTE.

QEM authors never intended an arbitrary application of the model at the extreme end of the spectrum. This White Paper is simply a call to take the work forward. Findings relating to equity of services direct policy makers to supplement funding equity to assure a truly equal learning opportunity for a small number of students.

Schools Characterized by Low Student Enrollment

This paper applies the Oregon Quality Education Model [QEM] to schools characterized by low enrollments. QEM authors build their model elementary school on an enrollment of 340. The middle school enrolls 500 and the high school enrolls 1000. These figures were not derived statistically as state medians but they are reasonable approximations of typical Oregon schools.

When is a school "small?"

The present work begins by defining small schools. QEM 2000's elementary school of 340 is taken to mean that 371 children actually attend with kindergarten students counted at 0.5 as they are under Oregon funding laws. It extends to 62 students per grade level. A model thus created ought to apply easily to schools half that size: those with 31 children per grade level. Therefore, in this work the elementary school has 16 children at each grade level with ADM calculated as 88.

The Oregon Small School Association [OSSA] membership qualification is a district enrollment of 1,650 ADM or less. On the supposition that students are equally distributed kindergarten through grade 12, the largest small school district in Oregon would have 132 students per grade level. QEM is therefore applied to a prototype district with 825 students--half of 1650—with 66 children at each grade level. A middle school in such a district houses 198 students in grades 6-8, and a high school has 264 students in grades 9-12.

QEM 2000 presents both a baseline scenario and a full prototype implementation. Baseline corresponds to current practice that assumes existing levels of funding without the current small school adjustment. This White Paper builds from baseline.

How many teachers are needed?

Added first is a reconfiguration of staffing. Staff will be certified in one core subject with teaching responsibilities for no more than three disciplines. Assumed are efficiencies derived from plausible rotations so specialized subjects may be taught alternate school years.

How does the lower teacher:student ratio affect other costs?

Also added is a reconfiguration of school-wide and district-wide per-student costs. A single teacher text, for example, can easily cost $40 or more. (Student texts are generally less expensive.) QEM 2000 uses a 1:23 middle school staffing ratio to conjecture an overall textbook cost (student and teacher) as $50/student. Based on different staff ratios, a middle school with 198 students can expect that cost to increase to $52/student. In some cases, the Data Base Initiative Project (DBI) has established sufficient information to substitute per student cost data.

Kindergarten
Class size
K-5 Classroom teachers
Specialists for areas such as art, music, PE, reading, math, TAG, ESL, library/media, second language, or child development
Special Education licensed staff
English as a second language licensed staff
Licensed substitute teachers
On-site instructional improvement staff
Instructional support staff
Additional instruction time for students not meeting standards
Professional development for teachers
Leadership training for administrators
Students per computer
Textbooks
Classroom materials & equipment
Other supplies
Operations and maintenance
Student transportation
Centralized special education
Technology Services
Other centralized support
District administrative overhead
Total cost per ADMw in 1998-99 School Year

* Calculations presume this school is in a district of average size.

340 Student Prototype Compared to 88 Student School

340 Student Baseline Prototype	88 Student K-5 Elementary School
Half-day	Half-day
24 average, no cap	19.2 average, no cap
13.5 FTE	4.0 FTE
2.2 FTE	1.0 FTE. A preferred choice would likely be two or three part-time staff but decision will be strongly influenced by availability of part-time teachers.
1.0 FTE	0.75 FTE (including 0.25 FTE itinerant) Part-time staff subject to availability. (Projected for 11 students--12% of enrollment.)
0.5 FTE	0.125 FTE
$66 per student	$87 per student based on ratio of FTE
None	None
5.0 FTE	1.5 FTE including 1.0 FTE special education
Limited	Limited additional instruction time but greater intensity available in regular day.
3 days	3 days less travel
Limited	None
12	12
$50 per student	$66 per student based on ratio of FTE
$113 per student	$149 per student based on ratio of FTE
$47 per student	$62 per student based on ratio of FTE
$535 per student	$706 per student based on ratio of FTE
$241 per student	$325 per student. This is adjusted based on DBI data. In small schools that are also remote, this figure is considerably higher.
$60 per student	$79 per student based on ratio of FTE*
$95 per student	$125 per student based on ratio of FTE
$142 per student	$187 per student based on ratio of FTE*
$208 per student	$274 per student based on ratio of FTE*
$4,378	**$5,783 = 132.1% of QEM 2000 Baseline**

Current approach for small school funding.

Oregon's current distribution formula [ORS 327.077] provides additional funding for elementary schools up to K-8 serving 224 children. The minimum number of students funded in any one school is set at 25. Schools are required to be remote which is described as "within eight miles by the nearest traveled road from another elementary school unless there are physiographic conditions that make transportation to another school not feasible." The law funds additional weight for each tenth of a mile from eight up to twelve miles from the next closest elementary school. Under current law a school of 88 students K-5 would qualify for additional funding as a small school.

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Class size in core subjects of math, English, science, social studies, second language
Staffing in core subjects
Extra teachers in math, English, and science
Additional staffing for core courses or electives
Special Education licensed staff
English as a second language licensed staff
Media/Librarian
Counselors
Licensed substitute teachers
On-site instructional improvement staff
Instructional support staff
Additional instruction time for students not meeting standards
Professional development for teachers
Leadership training for administrators
Students per computer
Textbooks
Classroom materials & equipment
Other supplies
Operations and maintenance
Student transportation
Centralized special education
Technology Services
Other centralized support
District administrative overhead
Total cost per ADMw in 1998-99 School Year

* Calculations presume this is the only middle school in a school district with 825 students.

500 Student Prototype Compared to 198 Student School

500 Student Baseline Prototype	198 Student Middle School, grades 6-8
23 average, no cap	16.9 average, no cap
16.8 FTE	7.0 FTE
None	None
4.0 FTE	2.0 FTE
3.0 FTE	1.5 FTE (including 0.5 FTE itinerant) (Projected enrollment for 24 students—12% of enrollment)
0.5 FTE	0.143 FTE
1.0 FTE	0.5 FTE
1.5 FTE (One for every 333 students)	0.6 FTE (One for every 333 students)
$66 per student	$73 per student based on ratio of FTE
None	None
11.0 FTE	3.5 FTE including 1.0 FTE special education
Limited	Limited additional instruction time but greater intensity available in regular day.
3 days	3 days less travel
Limited	Limited
12	12
$50 per student	$55 per student based on ratio of FTE
$126 per student	$139 per student based on ratio of FTE
$49 per student	$54 per student based on ratio of FTE
$535 per student	$592 per student based on ratio of FTE
$241 per student	$311 per student. This is adjusted based on DBI data. In small schools that are also remote, this figure is considerably higher.
$60 per student	$105 per student based on DBI data*
$95 per student	$105 per student based on ratio of FTE
$142 per student	$178 per student based on DBI data*
$208 per student	$451 per student based on DBI data*
$4,961	**$5,813 = 117.2% of QEM 2000 Baseline**

Current approach for small school funding.

Oregon's current distribution formula does not distinguish middle schools for small school funding. The elementary formula is applied. A middle school serving three grades would be funded only if enrollment did not exceed 84.

QEM 2000 Baseline High School

Class size in core subjects of math, English, science, social studies, second language
Staffing in core subjects
Extra teachers in math, English, and science
Additional staffing for core courses or electives
Special Education licensed staff
English as a second language licensed staff
Media/Librarian
Counselors
Licensed substitute teachers
On-site instructional improvement staff
Instructional support staff
Additional instruction time for students not meeting standards
Professional development for teachers
Leadership training for administrators
Students per computer
Textbooks
Classroom materials & equipment
Other supplies
Operations and maintenance
Student transportation
Centralized special education
Technology Services
Other centralized support
District administrative overhead
Total cost per ADMw in 1998-99 School Year

* Calculations presume this is the only high school in a school district with 825 students.

1,000 Student Prototype Compared to 264 Student School

1,000 Student Baseline Prototype	264 Student 4 year High School
24 average, no cap	16 average, no cap
35.6 FTE	10.5 FTE
None	None
6.4 FTE	3.0 FTE
3.75 FTE	1.5 FTE (including 0.5 FTE itinerant) (Projected enrollment for 32 students—12% of enrollment)
0.5 FTE	0.125 FTE
1.0 FTE	0.5FTE
3.0 FTE (One for every 333 students)	0.8 FTE (One for every 333 students)
$66 per student	$82 per student based on ratio of FTE
None	None
5.0 FTE	3.0 FTE including 1.0 FTE special education
Limited	Limited additional instruction time but greater intensity available in regular day.
3 days	3 days less travel
Limited	Limited
12	12
$50 per student	$62 per student based on ratio of FTE
$113 per student	$140 per student based on ratio of FTE
$47 per student	$58 per student based on ratio of FTE
$535 per student	$662 per student based on ratio of FTE
$241 per student	$311 per student. This is adjusted based on DBI data. In small schools that are also remote, this figure is considerably higher.
$60 per student	$105 per student based on DBI data*
$95 per student	$118 per student based on ratio of FTE
$142 per student	$188 per student based on DBI data*
$208 per student	$451 per student based on DBI data*
$4,978	**$6,413 = 128.8% of QEM 2000 Baseline**

Current approach for small school funding.

Oregon's current distribution formula [ORS 327.077] provides additional funding for high schools when ADM is below 350 for four-year institutions or below 267 for three-year institutions. Previous requirements that a high school be a specified minimum distance from the next closest facility serving the same grades is being phased out through 2005. The mechanics of the secondary formula are similar to that of the elementary. The minimum size is 60.

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The relatively higher per student cost of education in small schools is widely accepted. Under a system of schools funded primarily by local property tax, the reality was accepted without debate. The balance between what was needed and what was affordable was hammered out locally with the adoption of tax bases.

When schools were locally funded, the ballot box defined affordable levels of school quality.

Since the passage of Ballot Measure 5 ten years ago, Oregon schools have moved toward a dollars-per-student funding scheme. Considered on a statewide basis and in light of court decisions over the last twenty-five years, this design is plausible and does carry an overall sense of equity. Funding uses a formula that weights the student count to offset certain recognized additional costs. Small school factors are part of the scheme. The current weighting factor was adopted in 1995 and amended in 1999.

QEM adds science to school funding.

The Quality Education Model is characterized as an adequacy model. The purpose is to use scientific approaches to what education *should* cost. The science comes both in defining what is expected and in creating an objective basis for determining costs. It is a sophisticated strategy that casts previous formats as shooting from the hip.

Centralized administrative and support costs measured in dollars-per-student are likely to vary widely based on overall district size. A school with low student enrollment that is part of a district of average size will calculate very differently from a school with the same enrollment that is part of a district with low enrollment.

Note that 90 of Oregon's 198 school districts have a weighted student membership (ADMw) of less than 1,000. They are responsible for 23,000 students which is 4.4% of all students.

Findings Relating to Equity of Services.

The mechanics of weighting the student count are a reasonable method for flowing dollars to small schools. However, the current system needs to be re-calibrated to be consistent with QEM 2000.

- **"Small" must be re-defined based on QEM prototypes.**
- **A middle school element must be created.**
- **Centralized services must be reviewed using recent DBI data specifically for districts with low enrollment.**
- **Weighting must be modified to reflect QEM cost elements.**
- **Funding levels must be aligned with Ballot Measure 1.**

Schools Characterized by Sparse Distribution of Students

Sparsely populated school districts have an obvious additional transportation cost.

The distribution of students across a school district forces decisions related to school transportation. Every district is cognizant of costs particularly since each local district is responsible for 30% of the approved transportation costs from its resources. The balance is provided by state aid. (Approved transportation costs include home-to-school and special education, but do not include extra-curricular or other forms that are considered discretionary.)

Numerous infrastructure issues over which there is no control shape how a district makes its decisions. Are children evenly distributed, or are there concentrations of students in neighborhoods? Are there many roads with just a few students living on each? Or, are there a few roads with many children living on each? In addition, there are a host of safety issues from road conditions, to bridges and mountain passes, to congested areas that must be considered.

Are there other costs?

Once children are safely transported to school, however, any additional costs related to sparsely distributed students are difficult to define. There are tradeoffs in terms of extra-curricular activities or adoption of four-day schedules. But even a four-day schedule, which is probably the most extreme decision commonly made in sparsely populated areas, nets only a 4% reduction in overall costs.

QEM 2000 sets a $241/student average cost.

In the realm of transportation, Oregon's 30/70 split of transportation expenses may force a small, sparsely populated district to make significant reductions in programs because the 30% paid from the general fund may constitute a relatively large portion of resources. In North Lake School District, for example, approved transportation cost for 1998-99 is $234,011. That is more than 13% of total revenue under the state formula. This is significantly higher than the norm statewide. The district, therefore, must reduce educational services to pay transportation costs.

Findings Relating to Equity of Services.

Student transportation services are a required element of public education. The 30/70 split in transportation costs encourages districts to exercise their best judgment in creating a cost effective systems that also address the uncontrollable elements of natural features of the region, distribution of students and safety. School districts with relatively low enrollments that are sparsely distributed across the district are prevented from fully implementing the Quality Education Model.

- **A cap or other protection must exist so education dollars are not diverted to pay transportation for children living in sparsely populated school districts.**

Schools Characterized by Remote Settings

When is "remote" remote?

QEM 2000 assumes schools are located in close proximity to an urbanized area. Neither the QEM nor the professional literature defines close proximity or urbanized area.

A proximity factor of 45 miles reflects one hour of drive time on most highways. In practice, this constitutes a major psychological barrier for routine travel. QEM and the professional literature fail also to define urbanized area. Populations of incorporated Oregon communities (1998) present a large gap between 6,920 and 7,815. There are no communities in that range. This demographic detail depicts an urbanized area to be one populated by 7,800 people or more.

What happens when schools are more than an hour away from a community with a population of 7,800? The following chart is constructed using the QEM elements on the left. On the right is a description of how remote settings affect that element.

QEM 2000 Element	Challenge of Remote Setting
Core staffing	Recruitment and retention—The pool of professionals willing to move "to the middle of nowhere" is very limited. Applicants are not likely to be hard-charging mid-career professionals looking to build their reputations. Spouses frequently are not able to pursue their own careers because they cannot find work in their field.
Specialist staff	Recruitment and retention—These professionals are in short supply, generally, thus a remote setting exacerbates availability. Part-time positions—Smaller schools often need specialists on a part-time basis so recruitment is more difficult. Some decisions of what to offer or how to offer it may be driven by who is available.
Instructional support staff	Availability—This is a strength area in communities where there are few jobs available for well-qualified local people.
Professional development	Availability—Graduate programs required for continuing licenses require travel and often relocation for the entire summer during early career years when many have young families. This also discourages senior staff from accessing additional coursework. Travel—Professional participation (classes, regional training, or state-level work groups) carries significant travel requirements. At the extreme, a 3 hour meeting may require 1 1/2 day's time.
Computers textbooks materials equipment supplies operations maintenance	Availability—Shipping costs and delivery delays are routine but not usually insurmountable.
Centralized special education technology administration	Capacity—On-call, subcontract, and skilled staff are not available from local business community. Infrastructure is built upon "mom and pop" operations. Very little local commerce is supported by a large corporate structure. Capacity is only available through government. School districts and ESDs are often the largest, most diverse professional service providers in the region.

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Rural settings are a routine part of Oregon. Formulas funded using a dollars-per-student format are expected to absorb any customary cost anomalies associated with rural life. The isolation factors considered here are extreme. It is estimated that 39 school districts are more than 45 miles from the nearest urbanized area with a population of 7,800. They serve less than 2% of Oregon students but cover more than 1/3 of the State's landmass.

Less than 2% of students live in communities covering 1/3 of the state.

Issues of small size are (or should be) addressed through the school funding mechanism. What is left here is an absence of infrastructure. If a school district needs a service such as telecommunications, it may find that service not available at any price. There is probably no on-site administrator or technical expert. Digital services may be accessed only using microwave systems instead of fiber lines. Local businesses are generally independent with relatively little interest in telecommunications outside the region. There simply is not sufficient activity aggregated for a telephone company to bring in high capacity telecommunications.

The missing piece in the educational system is local infrastructure providing access to key support services.

Faced with the challenges identified, school districts in Oregon turn first to their education service district [ESD]. Recruitment, staff training, purchasing, and centralized services are very commonly provided by ESDs under resolutions with their component districts. Larger districts may be more self-sufficient. Urbanized settings offer commercial options. When neither of those choices are available, the ESD is the only alternative.

Education Service Districts are the primary resource.

Findings Relating to Equity of Services.

Education service districts serving these remote regions have brought services to their component school districts either through multi-region partnerships or by creating local capacity. Accepting the exceptional cost factors, ESD patrons self-imposed property taxes to provide needed services. Proposed equity funding for ESDs will eliminate these resources.

- **A separate revenue stream is required so remote school districts can access infrastructure that is commonly available in urbanized areas of the state.**

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About the Author

Jonathan Hill graduated from Willamette University with a degree in political science focussing on state and regional government. At the time he expected a career in public planning or as an attorney. His teaching credential came from a fifth year program at Portland State and was followed by a Master of Arts in Teaching degree from Lewis and Clark College.

Hill earned a Specialist in Education degree from the University of Nevada at Las Vegas. He studied rural schools and how they are organized. His professional paper is entitled *Effects of Structural Complexity on California School Principals*. Research findings were published by the National Association of Secondary School Principals. Presentations were made at the national conventions of the Association for Supervision and Curriculum Development and the National Rural Education Association.

A Doctor of Education degree was earned at Loma Linda University where the financial elements were incorporated into previous work. Dr. Hill's dissertation was *Issues of Public School Finance Considering District Size, Density and Organizational Complexity*. Research findings were presented at the national convention of the American Education Finance Association.

Jonathan Hill has been a teacher in Washington, Oregon, and California. Assignments ranged from a parochial school of 190, to a middle school of 300 and an elementary school with 800 students. He was an administrator for Rialto Unified School District before becoming a principal and district administrator for Needles Unified School District. Needles is a district of 6,000 square miles that enrolls 1,500 students at a total of nine sites.

Jonathan served for more than four years with the San Bernardino County Superintendent of Schools administering special education programs for 200 students with moderate to profound disabilities. Classes were at 14 school sites across 17,500 square miles of Mojave Desert. Hill has been superintendent of Lake County Education Service District since 1992.

Superintendent Hill served on the original committee creating the Oregon Quality Education Model as well as Teacher Standards and Practices Commission. He lives in Lakeview with his wife, a teacher for Adel School District, and his daughter, a senior at Lakeview High School. The Hills have two adult children and three grandchildren.